# Contribution Details

*Type of Submission:* Oral Presentation

## Report of Project Id 32396_2: Advanced Remote Sensing Methods for Land Degradation Assessment by Coupling Vegetation Productivity and Climate in Drylands

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*Author information is only visible to chairs and administrators*

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*Land & Environment:* 32396 - Land Degradation Surveillance of Drylands in China

2 pages

### Abstract

The objective of Dragon 4 Project 32396_2 aims at detecting land degradation in dry lands at a regional scale. The main achievements acquired during the last years could be summarized as follows:

(1) **Assessment and monitoring of land degradation in dry lands of China**: T With the development of remote sensing technology, long time series remote sensing data have been available for land degradation assessment and monitoring, and the vegetation indicators, such as the NDVI, NPP, Vegetation coverage and biomass were commonly used. However, time series vegetation index will fluctuate severely due to the impact of climate change, especially the fluctuation of annual precipitation, thereby the land production capacity could not be determined accurately. Therefore, to solve the problem, Xilin Gol League, Inner Mongolia Autonomous Region, China, where the land degradation is prevailing in the first decade of the 21st century was selected as the study area. Based on the annual NPP dataset estimated by 10-Day composite NDVI from Envisat-Meris data at 1.2km resolution during 2003 to 2013 and the same period meteorological raster dataset, a new Moisture-responded Net Primary Productivity (MNPP) method, for identifying areas of land degradation based on the change of annual NPP and MNPP over time and Moisture Index (MI) was developed. It was expected that provide technical support and scientific reference data for land degradation assessment and monitoring in study area, even in the whole drylands in China.

(2) **Estimating Soil Organic Carbon Density in the Otindag Sandy Land, Inner Mongolia, China.** Accurate quantitative estimates of soil organic carbon density (SOCD) can effectively represent regional carbon cycle processes and regulation mechanisms, and can serve as reference data when making land management decisions. Limited research, however, has been carried out in arid or desert zones covered with sparse vegetation, despite the fact that these cover wide areas of the earth and play a significant role in global carbon cycles. In this study, the Otindag Sandy Land and its surroundings (OSLAIS) in the Inner Mongolia Autonomous Region of China was selected as the study area. The study introduces a useful technique for making high spatial coverage SOCD estimates for drylands by utilizing GF-1 WFV optical satellite images and a time series of MODIS satellite remote sensing datasets, and using these to optimize parameters for simulation models in conjunction with other technical procedures that are described. We expect this research to provide useful technical support and scientific reference data for land management and for land degradation/desertification assessments, for the study area monitored, as well as across the whole dryland area of China.

(3) **Estimating Above Ground Biomass in the Otindag Sandy, Inner Mongolia, China by Using Sentinel-2 data.** Above ground biomass (AGB) is an important measure of terrestrial ecosystem productivity, and it is used in quantifying the role of vegetation in the carbon cycle, the potential for energy production, and the carbon stock estimation for climate change modelling. Dryland AGB, also recommended as the indicator of land productivity by UNCCD in desertification assessment and monitoring, need to be quantitative assessed and evaluated. In this study, the Otindag Sandy Land and its surroundings (OSLAIS) was set as the study area and a useful method for sparse vegetation aboveground biomass inversion in dryland was promoted. Firstly, the Sentinel-2 remote sensing data coved the whole area in growing season (May to September) during 2015 to 2018 and synchronous field survey data was collected and processed. Then, the estimation model was constructed by linear regression model, power function model, exponential model and machine learning model by taking band information, texture information and different vegetation index into consideration. In addition, total 2/3 field survey sampled AGB data were used for modelling, and the remaining 1/3 measured AGB data was set as the testing to evaluate the AGB estimation models. Finally, the AGB distribution of the OSLAIS was mapped and analysed based on the optimal model. This research is expected to provide technical support and scientific reference data for vegetation assessment and monitoring in the study area, and even across the entire dryland of northern China.

### Submitted File(s)

1st file Abstract-32396-Chinese.pdf

2nd file **No upload yet.**

### Session Details

WS#5 ID.32396: Degradation Surveillance of Drylands

*Time:* **Wednesday, 26/Jun/2019: 8:30am - 10:00am** *Workshop:* **LAND & ENVIRONMENT**

*Session Chair:* **Prof. Laurent Ferro-Famil**

*Session Chair:* **Prof. ErXue Chen**

Room: Glass 2, first floor